United States Department of Agriculture

Marketing and Regulatory Programs

Animal and Plant Health Inspection Service

Panama Cooperative Screwworm Eradication Program

Environmental Analysis, July 2001

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I. Need for the Proposal

A. Introduction

The screwworm, *Cochliomyia hominivorax*, is a fly of the family Calliphoridae that can be found in the tropical and subtropical regions of North, Central, and South America. The screwworm is a serious pest of warm-blooded animals, causing injuries and death to livestock, domestic animals, and (sometimes) human beings. Screwworm adults are attracted to the open wounds of animals where they lay eggs that hatch into larvae (maggots). As the larvae feed on the flesh of an animal, the infested wound becomes enlarged and putrid, attracting more screwworm flies that lay more eggs. If untreated, screwworms may cause the death of the animal within ten days. Less severe cases are characterized by weight loss and secondary bacterial infections.

International Services (IS) as a component of the Animal and Plant Health Inspection Service (APHIS) within the U.S. Department of Agriculture (USDA) has participated in a number of successful cooperative screwworm eradication programs in Mexico and Central America. As a result of those cooperative efforts, Mexico was officially declared free of screwworms in 1991, Belize and Guatemala in 1994, El Salvador in 1995, Honduras in 1996, Nicaragua in 1999, and Costa Rica in 2000. An official declaration of screwworm free is anticipated for Panama in 2002.

B. Purpose and Need

To eliminate the screwworm's threat to livestock and humans through reinfesting eradicated areas of Central America, Mexico, and the United States, IS is proposing to cooperate with the government of Panama in an ongoing program to prevent screwworms present in Colombia, South America from moving northward. This will be accomplished through a cooperative eradication program with Panama (now almost completed) followed by the construction of a new screwworm rearing facility in that country. This new facility will be used to maintain a permanent barrier along the Colombian border. It will be constructed on the site of an abandoned sugar plantation and processing center located immediately west of Pacora, Panama.

The cooperative program with Panama has been authorized under the terms of a cooperative agreement, the "Cooperative Agreement Between the United States Department of Agriculture, and the Commission for the Eradication and Prevention of Screwworms (COPEC)."

This environmental analysis has been prepared in compliance with Executive Order 12114 (EO 12114) of January 4, 1979, entitled "Environmental Effects Abroad of major Federal Actions." EO 12114 "represents the United States Government's exclusive and complete determination of the procedural and other actions to be taken by Federal agencies to further the purpose of the National Environmental Policy Act with respect to the environment outside the United States, its territories, and possessions."

II. Alternatives

Three broad alternatives were considered for screwworm control in Panama: (1) a cooperative screwworm eradication program (the preferred alternative), (2) a cooperative screwworm suppression program, and (3) no action. Those alternatives are described concisely in this section and their predicted environmental impacts are considered in the section that follows.

A. Panama Cooperative Screwworm Eradication Program (Preferred Alternative)

The proposed Panama Cooperative Screwworm Eradication Program would be characterized by a comprehensive program to detect screwworms, treat livestock, regulate the movement of infected livestock, and destroy wild screwworms through a sterile insect release program. The release of sterile screwworms, a technique used with great success and negligible environmental impact for the past 20 years, involves the mass rearing, sterilization, and release by aircraft of the sterilized screwworm flies. The flies are released in sufficient quantities to outnumber and outcompete wild screwworm males in the mating process. After successive releases, the wild screwworm population decreases to zero. Under this alternative, a new screwworm rearing and irradiation facility would be built on the site of an abandoned sugar plantation near Pacora, Panama.

B. Panama Cooperative Screwworm Suppression Program

For comparison's sake, a hypothetical Panama Cooperative Screwworm Suppression Program was also considered. A screwworm suppression program would have the objective of reducing screwworm populations to below an economic or public health threshold, but would not attempt to completely eliminate the screwworm population from Panama. Such a program would be capable of

using, depending upon available resources, any of the techniques specified above for the eradication program: detection, treatment of livestock, regulation of livestock movement, and release of sterile screwworms. A suppression program would be of indefinite duration and, depending upon the methodologies employed, might not require the construction of a screwworm rearing facility.

C. No Action

The no action alternative would not involve IS in a cooperative program to eradicate or suppress screwworms in Panama. IS activities under the no action alternative would probably be limited to professional consultation and some coordination with the Panamanian Government in support of activities in adjoining countries. The responsibilities for the eradication or suppression of screwworms in Panama would fall to the Panamanian Government, local jurisdictional governments, or producers. The no action alternative could result in the continued presence of screwworms in Panama as well as their northward movement into eradicated countries.

III. Environmental Consequences

A. Panama Cooperative Screwworm Eradication Program

The objective of the Panama Cooperative Screwworm Eradication Program is to eradicate the endemic population of screwworms from Panama and to establish and maintain a barrier of sterile flies at the Darien Gap along the border with Colombia. This barrier would create a screwworm-free zone that would benefit Panama, Central America, Mexico, and the United States by ensuring better health for animals and people, less need to treat infections from screwworm fly infestations, more efficient and higher quality meat production, and less need to use pesticides or other control techniques against screwworms. The other alternatives would benefit Central and North American countries that have had screwworm infestations (Panama Cooperative Suppression Program) or place all countries within the historical range of the screwworm fly at risk of adverse effects (no action).

1. Screwworm Control

The primary control measure used against the screwworm fly is the release of sterile screwworm flies. In addition, the program will control screwworm flies through the use of chemical larvacides that kill living larvae found in the wounds of

infested hosts and prevent reinfestation of these wounds. The environmental consequences from these actions are generally slight with adherence to program procedures.

The sterile release program has minimal impact on the environment except the target insect. The irradiated insects are sterile, but they are not radioactive. These sterilized insects pose no hazard to the environment. The sterile flies mate with wild screwworm flies and some may serve as food for natural fly predators. Aircraft are generally used to release sterile flies. Pilots follow specific routes and procedures to ensure safe, accurate, and timely releases of viable sterile flies within the target area. Adherence to these procedures decreases the potential for accidents and ineffective releases.

Part of the Panama Cooperative Screwworm Eradication Program will be to encourage the use of a 5% dust formulation of coumaphos provided to ranchers to treat external wounds on domestic animals and livestock in order to control and/or prevent screwworm infestations. This formulation is registered with the U.S. Environmental Protection Agency (EPA) for this use. Program personnel and ranchers will be trained in the proper application procedures and safety precautions for this larvacide. Applications of this formulation are effective against screwworm flies and are not repellant to the flies. Coumaphos is a moderately toxic organophosphate insecticide. Proper application of this formulation is safe to the applicator and to the treated animal. Proper handling of the coumaphos formulation poses no risk to components of the environment other than the screwworm flies or other parasites that could infest external wounds. Although other insecticide formulations may effectively control screwworm flies, they may be more toxic to the infested host, be more irritating to the wound tissue, have repellant qualities to screwworm flies, or lack current EPA registration for this type of treatment. As part of the planned mitigation measures for the program, the program will also implement appropriate pesticide storage and disposal procedures for coumaphos.

2. Facility Construction and Safety

Issues related to the rearing facility were considered for this assessment. These issues relate to effects from facility construction, treatment and disposition of process water and waste water, disposition of wastes and by-products of the laboratory rearing procedures, and the use of irradiation treatments.

The proposed site is part of an abandoned sugar plantation in Pacora, Panama. The site consists of old buildings from a sugar mill facility and part of the adjacent sugar cane fields. The proposed plan is to renovate some of the existing buildings and/or construct new buildings needed for the rearing facilities. Construction at this

location is not expected to affect the environmental conditions of the site appreciably. The buildings at the sugar mill are from 10 to 23 meters above sea level. This elevation is at least 6 meters above high water records for flooding of the Pacora River. Soil erosion from construction is expected to be minimal and result in a negligible amount of siltation to the Pacora River nearby and to the Pacific Ocean. Disturbance from building and road construction is expected to result in only temporary effects to local plant and animal communities, which should recover readily from this action.

The proposed facility requires process water for domestic uses (restrooms and drinking water) and rearing purposes. The source of water will be the Pacora River at an existing spillway, which was determined to be a reliable intake point. The water withdrawn from the Pacora River will be replaced by treated effluent water discharged from the facility downstream from the site.

The treatment of water from the river is a multi-step procedure to ensure that water quality would meet U.S drinking water standards. The treatment procedures involve mixing, coagulation, flocculation, clarification, filtration, and disinfection processes. The disinfection is achieved through water treatment with 5 ppm chlorine. This ensures safe drinking water for workers and high water purity for use in the preparation of media for rearing screwworm flies. In addition to safe domestic drinking water and process water, this also provides a water supply for use in case of fire and other emergencies.

Shrimp rearing areas are located on the river estuary downstream from the proposed site of discharge of effluent from the facility. The protection of this resource requires that treated effluent waters that are returned to the river meet a high standard of purity. The proposed treatment of process water and wastewater effluents is designed to meet regulations of the state of Florida for Surface Water Quality Criteria for Shellfish (State Code Section 17-302.530) and secondary treatment levels required by U.S. Federal Statute PL 92-500 of the Federal Water Pollution Control Act. The process water undergoes heat treatment by a steam injection system before mixing with the domestic waste water for further treatment. The treatment continues with chlorination, coagulation, and initial clarification before sedimentation in aerated lagoons. The liquid effluent from the lagoons goes through a final clarifier before disinfection and discharge to the Pacora River. The sludge that accumulates in the lagoons will be collected and dried. There may be some temporary storage of semi-dried sludge in containers on site until incineration. The incinerator of this sludge is to be equipped with a Venturi scrubber to remove particulates and a tray tower to remove flue gases and associated gaseous compounds. This ensures maintenance of good air quality.

The ash from incineration is collected and disposed of in a landfill on the premises near the waste water treatment plant. This landfill is to be lined with high-density polypropylene foil and acid-resistant concrete to prevent groundwater contamination. The landfill is projected to handle ash for a 25 year period. In conclusion, this thorough treatment of effluent waters from the facility is expected to protect and enhance the water quality of the Pacora River.

Adherence to stringent safety guidelines is required in all steps of sterile insect production. Irradiation equipment is checked on a regular basis for compliance with Nuclear Regulatory Commission regulations and no problems associated with its use have been known to occur at any APHIS facility. The equipment irradiates only the pupal stage of the flies, but the flies do not store any radioactivity from their exposure. The equipment is designed to eliminate any likelihood of worker exposure. Dosimeters are used to monitor worker exposure to irradiation and each worker is required to take a regularly scheduled physical examination. The safety guidelines have been shown to effectively protect workers at other APHIS sterile insect facilities.

3. Other Issues

The other issues related to the Panama Screwworm Eradication Program include monitoring, environmental justice, and endangered species. Each of these issues is associated with specific environmental compliance requirements. Adherence to the program procedures, the Environmental Justice executive order, and the provisions agreed upon through interagency consultations prevent these issues from posing any substantial environmental risks.

a. Monitoring

The program's monitoring of screwworm fly populations and movement involves detection by insect traps, surveillance of host animals for infections, and reporting of cases of infection by ranchers, veterinarians, and medical personnel. Swormlure-IV®, the lure used in the screwworm traps, releases a strong odor like decaying flesh of animals to attract the screwworm flies. Although traps may capture other arthropods, it is anticipated that screwworm flies will be the primary organism collected. Capture of other arthropods in any traps is not expected to adversely affect populations of any of those species. Surveillance of host animals and reporting systems pose no adverse effects on the environment.

In addition to pest population monitoring, there is also monitoring for worker health and pesticide effects. There are guidelines for health and safety of workers at the facility and records are kept for all personnel. The program has incorporated as part of its mitigating measures the development and implementation of pesticide

monitoring. There will be limited use of the coumaphos as a larvacide on external wounds to control and/or prevent screwworm infestations. Records will be kept about the quantity of coumaphos applied by ranchers.

b. Environmental Justice

Consistent with Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," APHIS considered the potential for disproportionately high and adverse human health or environmental effects on any minority populations and low-income populations. No disproportionate effects on such populations are anticipated as a consequence of implementing the preferred action. This action, however, is expected to provide employment and income to local residents. The isolated location of the facility and the measures taken to thoroughly treat all effluent ensure that no residents of adjacent localities will be adversely affected by the program actions.

c. Endangered and Threatened Species

Panama is rich in animal and plant resources. Parts of the rain forest are directly adjacent to Panama City. Despite the abundance of natural areas in Panama, some species populations are declining due to loss of habitat, agricultural practices, and human encroachment. The wild areas of Panama are steadily disappearing due to deforestation, urban and industrial expansion, inadequate soil conservation practices, contamination of natural resources, and changes in the natural hydrologic cycle. Some species are protected in national parks and sites administered by the Smithsonian Institution, but many species are not restricted to these areas. The statutory authority for protection of endangered and threatened species generally does not carry as much weight as the local economic concerns, and protection of these species may not be as important to local government as other considerations. The large undeveloped tracts of land such as the forested areas of the Darien Gap maintain some populations of these species, but development pressures are expected to eventually affect these locations.

APHIS has used information from a variety of sources to develop a consolidated listing of species which are endangered, threatened, or of concern within Panama. APHIS received verification of the Federally listed endangered and threatened species in Panama from the U.S. Department of the Interior's Fish and Wildlife Service (FWS). In addition, discussions were held with Panama's Department of Natural Resources, INRENARE, and the Smithsonian Tropical Research Institute in Panama. Based upon these discussions, a list of species of concern to Panama

was prepared. Table 1 is a consolidated listing of Panamanian species which have been: (1) federally listed (50 CFR 17.11 & 17.12) by the United States as endangered or threatened under the Endangered Species Act, (2) identified as species of concern by the Government of Panama (INRENARE), or (3) identified as species of concern by other authorities or researchers (e.g. Smithsonian Tropical Research Institute) through comments provided to APHIS during the scoping process.

No adverse effects are foreseen as a consequence of the program for assessed species. The site for the sterile fly research laboratories is disturbed habitat that is not known to harbor any endangered or threatened species. The thorough treatment of water and wastewater ensures that any species in the Pacora River will benefit from higher water quality. The release of sterile flies is not expected to affect any endangered or threatened species. In conclusion, the actions of this program are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of critical habitat.

Table 1. Panamanian Endangered and Threatened Species

Species	Common Name	Status
Mammals:		
Alouatta palliata (=*villosa*)	Monkey, howler	E
Ateles geoffroyi panamensis	Monkey, spider	E
Felis concolor	Lion, mountain	**
Felis concolor costaricensis	Puma, Costa Rican	T
Felis rufus escuinapae	Bobcat	E
Felis tigrinus	Cat, tiger	E
Felis wiedii	Margay	E
Felis yagourandi panamensis	Jaguarundi	E
Leptonycteris curasoae (=sanborni) yerbabuenae	Bat, lesser (=Sanborn's) long-nosed	E
Leptonycteris nivalis	Bat, Mexican long-nosed	E
Panthera onca	Jaguar	E
Saguinud oedipus	Marmoset, cotton-top	E
Saimiri oerstedii	Monkey, red-backed squirrel	E
Tapirus bairdii	Tapir, Central American	E
Birds:		
Falco peregrinus anatum	Falcon, American peregrine	E
Falco peregrinus	Falcon, peregrine	(S/A)
Harpia harpyja	Eagle, harpy	E
Mycteria americana	Stork, wood	**
Numenius borealis	Curlew, Eskimo	E
Pelecanus occidentalis	Pelican, brown	E
Polyborus plancus audubonii	Caracara, Audubon's crested	**
Sterna antillarum	Tern, least	**
Reptiles:		
Chelonia mydas	Turtle, green sea	E
Crocodylus acutus	Crocodile, American	E
Dermochelys coriacea	Turtle, leatherback sea	E
Eretmochelys imbricata	Turtle, hawksbill sea	E
Lepidochelys kempii	Turtle, Kemp's (=Atlantic) ridley sea	E
Lepidochelys olivacea	Turtle, olive (=Pacific) ridley sea	E
Amphibian:		
Atelopus varius zeteki	Frog, Panamanian golden	E

Key: E = U.S. federally listed endangered species; T = U.S. federally listed threatened species; P = Panamanian species of concern; ** = Historic range includes Panama, but U.S. Federal listing does not; S/A = Similarity of Appearance - no consultation necessary.

B. Panama Cooperative Screwworm Suppression Program

A screwworm suppression program would involve continued (for an indefinite duration) vigilance and control of an endemic screwworm population in Panama. Deaths in livestock from secondary infections and weight loss from infections by screwworm fly larvae (maggots) would be expected to have a substantial impact on the agroindustry of Panama. The medical and veterinary expenses to control and treat screwworm fly infections would be difficult for some low-income residents whose survival depends upon good personal health and healthy livestock.

Currently, screwworms have been eradicated from Costa Rica. However, eradication of the screwworm in Costa Rica does not alleviate to any great degree the screwworm problem in Panama. Containment would be more difficult at the Costa Rica/Panama border than at the Darien Gap. The potential for re-infestation of Costa Rica from Panama is very likely. A fly-free zone in Costa Rica would constantly be challenged by the movement of infected wildlife and transport of infected livestock across the border, particularly in rural areas where checkpoints and surveillance are more difficult.

A suppression program would require continual and close monitoring of host animals for infection and traps for flies in Costa Rica. It is expected that detections in Costa Rica would result in the need for regular releases of sterile screwworm flies to maintain the fly-free zone. There are no sterile fly facilities in Costa Rica. The lack of sterile fly facilities would make it necessary to have the sterile flies flown in by plane from facilities further north. The transportation costs and logistical aspects of this would be much more tenuous than for construction and maintenance of permanent rearing and release facilities in Panama.

Although the adverse impacts from the suppression alternative are less than the adverse impacts of the no action alternative, the overall adverse impacts of the Panama Cooperative Screwworm Eradication Program are less than the suppression alternative and the long-term benefits of eradication are greater.

C. No Action

This alternative would result in the gradual movement of infested screwworm fly populations northward to the historic limits of distribution in the Western

Hemisphere. Just as with the screwworm suppression alternative, there would be no benefit to Panama. The damage to human health, livestock health, and meat production would increase, commensurate with the spread of the screwworm fly. There would also be greater infestations of wildlife species that serve as hosts and this would serve as a source for continuing transmission to humans and domestic hosts. The reductions in quantity and quality of meat in the infested areas would be substantial. The benefits from all completed screwworm fly eradication programs in North and Central American countries would be lost eventually if there were no program to at least suppress the fly movement at the southern Costa Rican border. There would be increased use of pesticides to try to minimize the damage from screwworms. The potential for greater adverse effects from the uncoordinated control of pesticide applications is likely if there were no governmental control actions. The adverse consequences of selecting No Action make it the least desirable alternative because this selection would result in the most short and long-term adverse effects to the human environment.

IV. Agencies and Persons Consulted

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
International Programs
4700 River Road, Unit 65
Riverdale, MD 20737-1233

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Policy and Program Development
Environmental Services
4700 River Road, Unit 149
Riverdale, Maryland 20737-1238

Finding of No Significant Impact
for
Panama Cooperative Screwworm Eradication Program,
Environmental Analysis, June 2001

The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), has prepared an environmental analysis (EA) that analyzes alternatives for control of the screwworm, *Cochliomyia hominivorax*, in Panama. The screwworm is a serious pest of warm-blooded animals, causing injuries and death of livestock, domestic animals, and (sometimes) human beings. The EA, incorporated by reference in this document, is available from:

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
International Services
4700 River Road, Unit 65
Riverdale, MD 20737-1233

The EA is available for public inspection at USDA, Room 1141, South Building, 14th Street and Independence Avenue, SW., Washington, DC, between 8 a.m. and 4:30 p.m., Monday through Friday, except holidays. Persons wishing to inspect the EA are requested to call ahead at 202-690-2817 to facilitate entry into the reading room.

The EA for this program analyzed alternatives of (1) a cooperative screwworm eradication program (the preferred alternative), (2) a cooperative screwworm suppression program, and (3) no action. Each of those alternatives was determined to have potential environmental consequences. APHIS selected a cooperative screwworm eradication program because of its ability to eliminate destructive screwworm populations with a minimum of potential environmental consequences.

APHIS has consulted with the Government of Panama, with which it will be cooperating, on the potential environmental impacts of this program. No adverse impacts are foreseen for human health, the physical environment, and nontarget species (including endangered and threatened species, and species of concern to Panama.)

I find that implementation of the proposed program will not significantly impact the quality of the human environment. I have considered and based my finding of no significant impact on the quantitative and qualitative risk assessments of the proposed pesticides and on my review of the program's operational characteristics. In addition, I find that the environmental process undertaken for this program is entirely consistent with the principles of "environmental justice," as expressed in Executive Order No. 12898.

Lastly, because I have not found evidence of significant environmental impact associated with this proposed program, I further find that no additional environmental documentation need be prepared and that the program may proceed.

/s/ **7/12/01**

Dr. Angel Cielo **Date**
Deputy Administrator
International Services